

# Next Generation Server Platforms and Technologies

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Title: VP, Business Development

Company: ServerWorks Corp.



San Jose January 23-24, 2001



Taipei February 14-15, 2001

# Agenda

- ServerWorks acquired by Broadcom
  - Great synergy
- Server Technology Markets
  - Not just servers, but networking, storage
- Server Technology
  - Memory, I/O bandwidth, new topologies


# Broadcom/ServerWorks Synergy

## BROADCOM

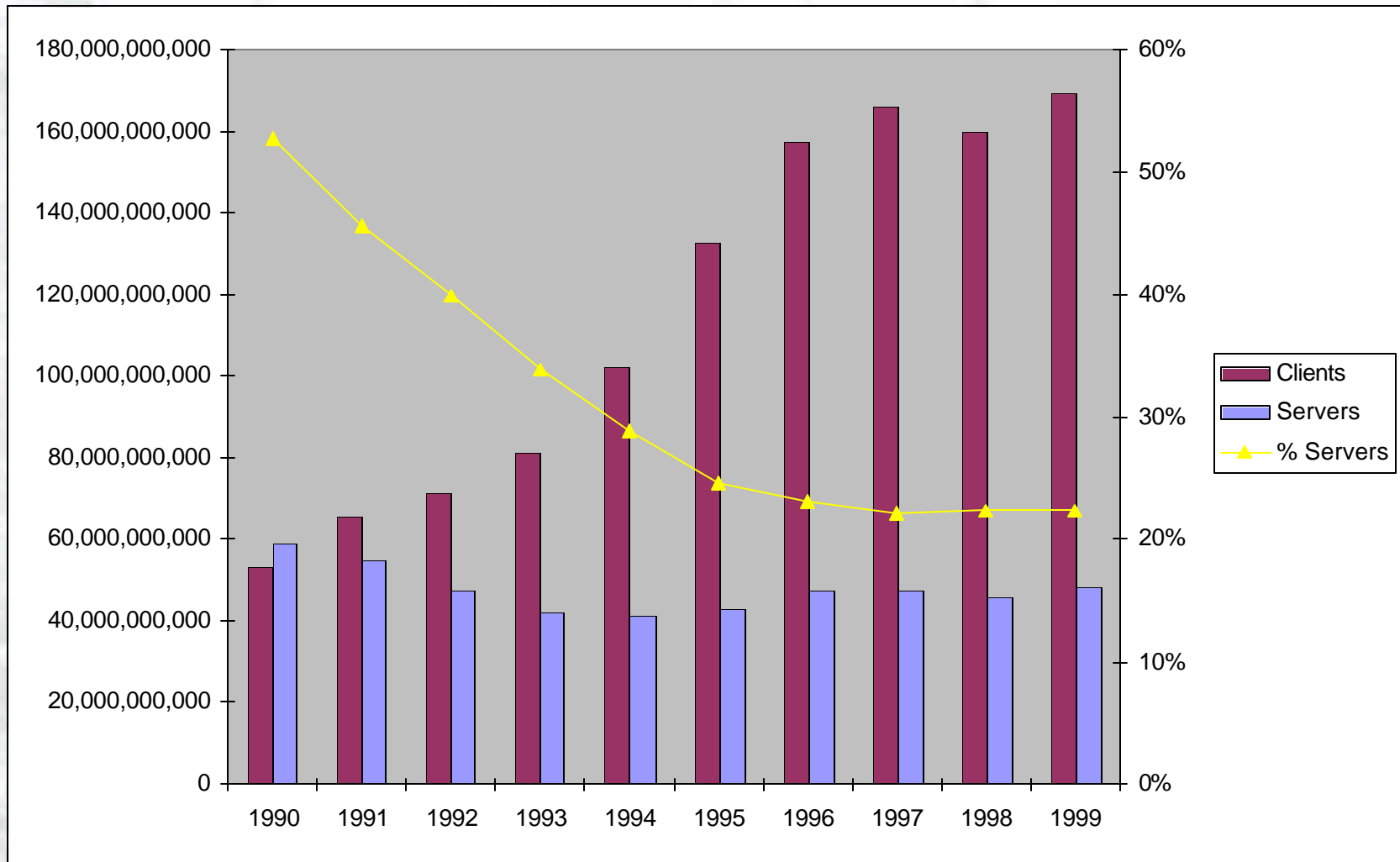
- Layer 3-7 Switching Technology
- Broadband Network Access (Cable-Modem, DSL, Wireless)
- High-Speed I/O & Mixed-signal in CMOS
- VOIP Hardware and Software
- High Speed Network Security & VPN
- Networking Protocol Processing
- WW Marketing, Sales, & Operations

## SERVERWORKS

- Market Leading Server and Storage Silicon Solutions
- High-Performance Memory Control, Bus Arbitration and I/O Switching
- High-Speed Fault-Tolerant Memory Technology
- Lossless Memory Compression
- Multiprocessor System Expertise

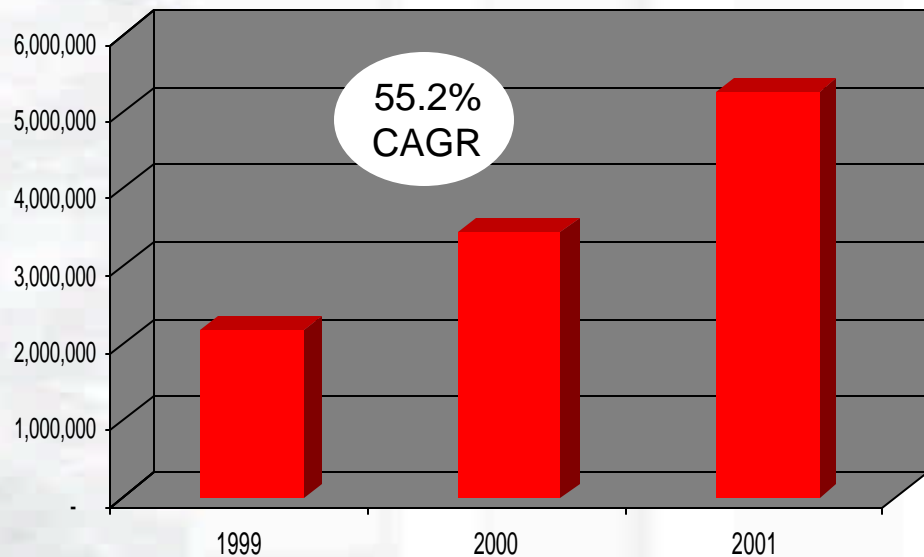
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- The diagram illustrates the synergy between Broadcom and ServerWorks. Two boxes at the top, labeled 'BROADCOM' and 'SERVERWORKS', contain lists of their respective technologies. Two arrows point from these boxes down to a central box that lists the integrated solutions resulting from their partnership.
- Wire-Speed 10Gbps Connectivity Solutions (InfiniBand, Ethernet, Fibre Channel)
  - Integration of Firewall & Network Security Functions
  - Integration of Voice, Video, & Data Gateway Functions

# In the 1990s, \$ Spent Shifted from Servers to Clients ...



# High Growth Target Markets

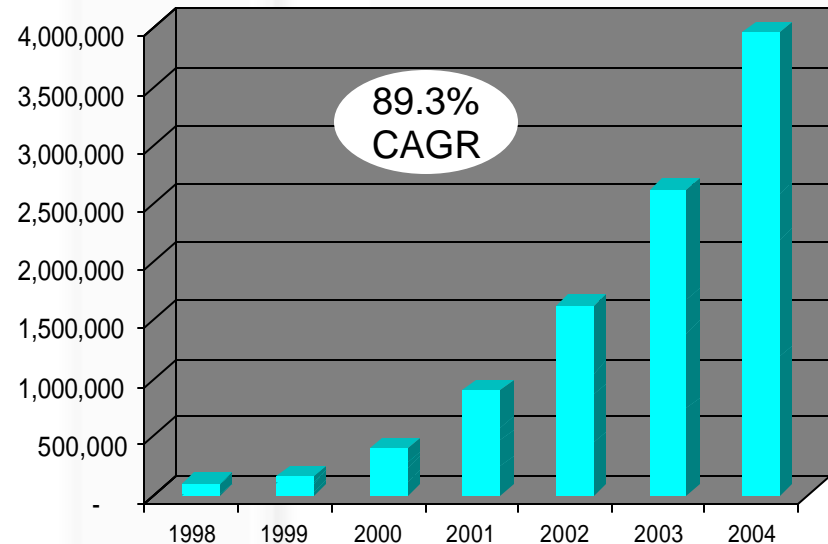
- Enterprise and High Volume Servers
- Performance Workstations



**Servers and Workstations**

Source: Source: Mercury Research, November 2000

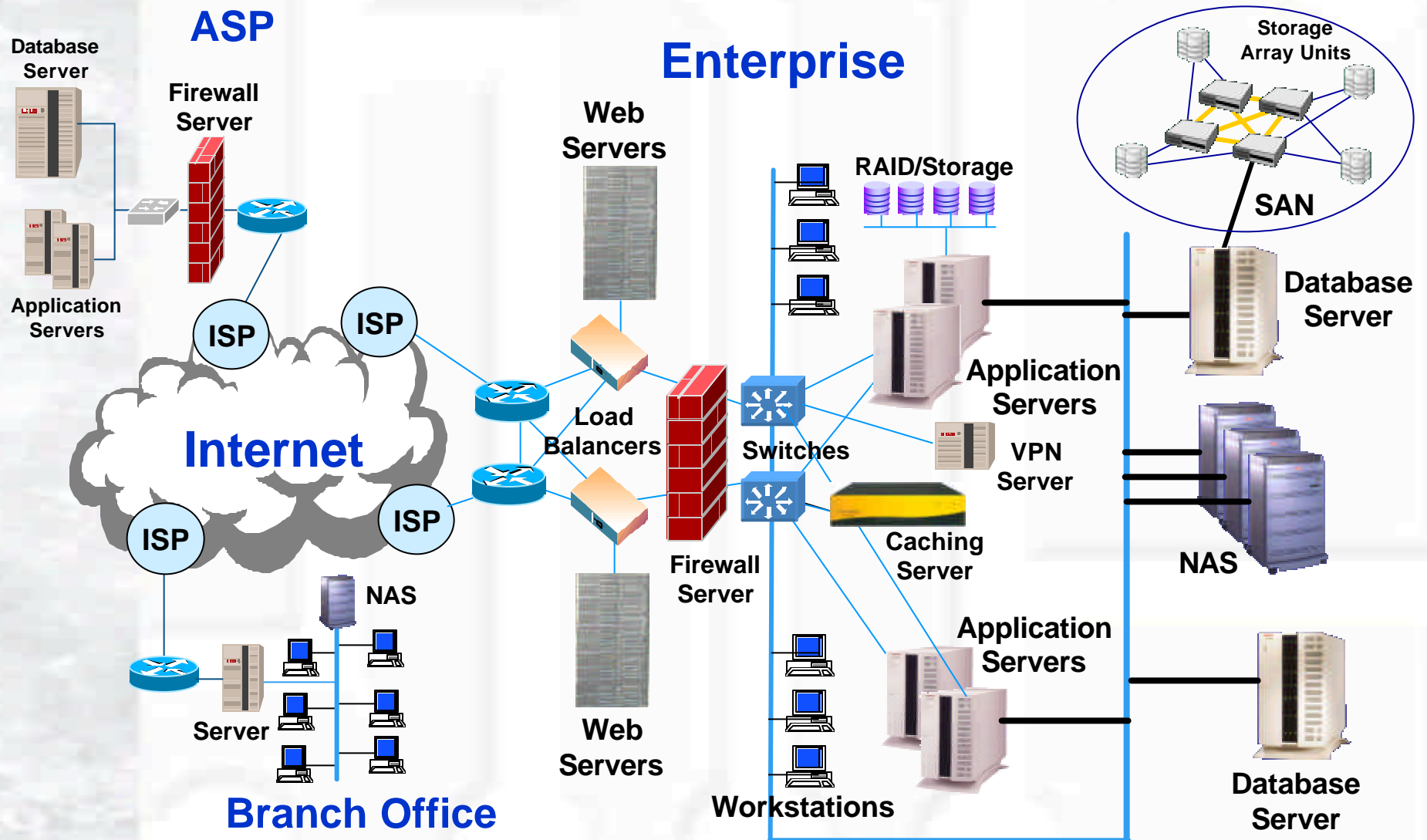
- Advanced Storage Platforms
- Networking and Server Appliances



**Storage and Server Appliances**

Source: Dataquest, December 2000.

# Server Technology Broadly Deployed



# OEMs Using Server Technology

## Servers

Compaq

Dell

Fujitsu

Hitachi

HP

IBM

Intel

NEC

Siemens

Stratus

## Networking

CacheFlow

Cisco

F5

Lucent

Nortel Networks

Cobalt/Sun

## Storage

DigitalScape

EMC

Maxtor

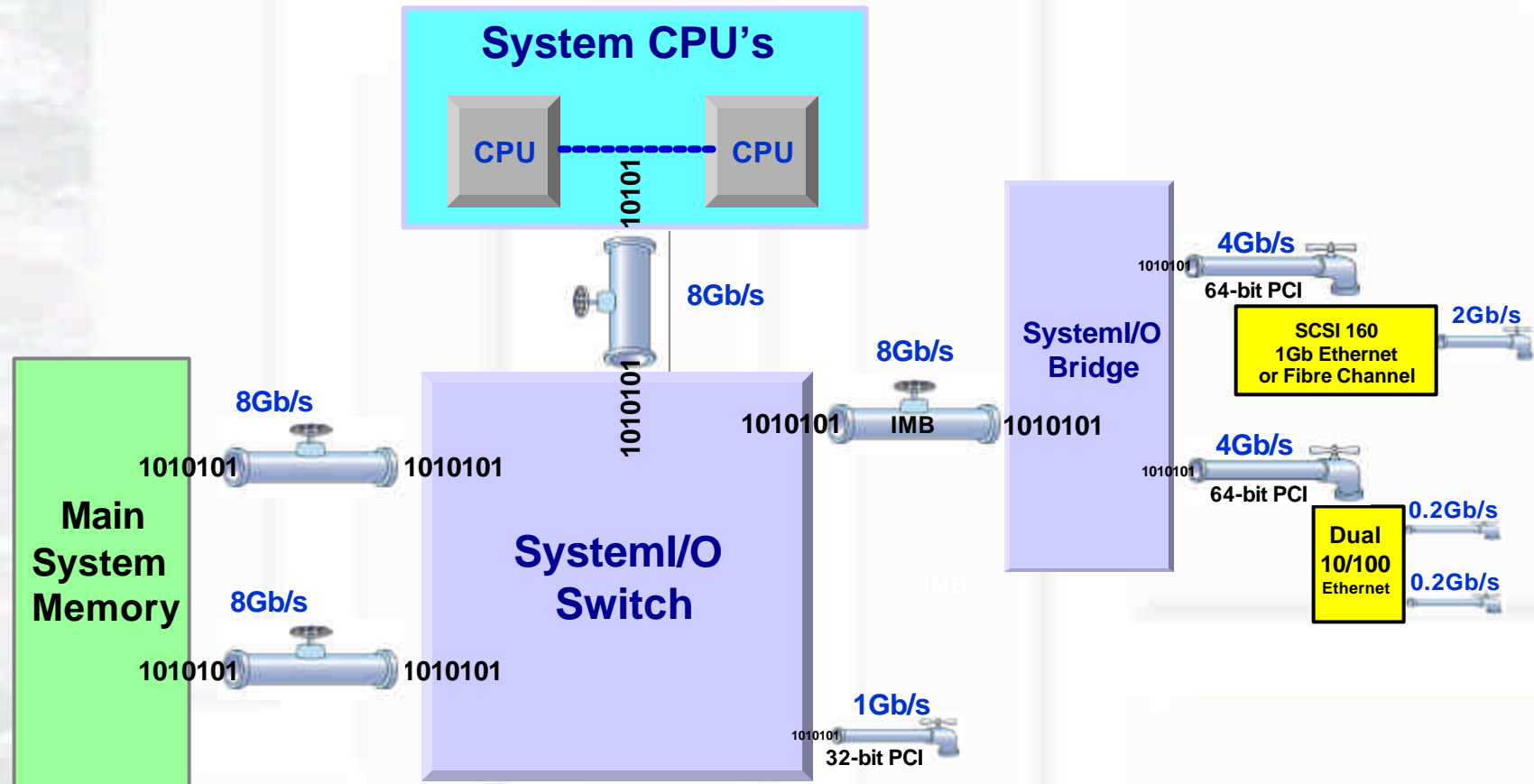
Network Appliance

Network Engines

Quantum Snap

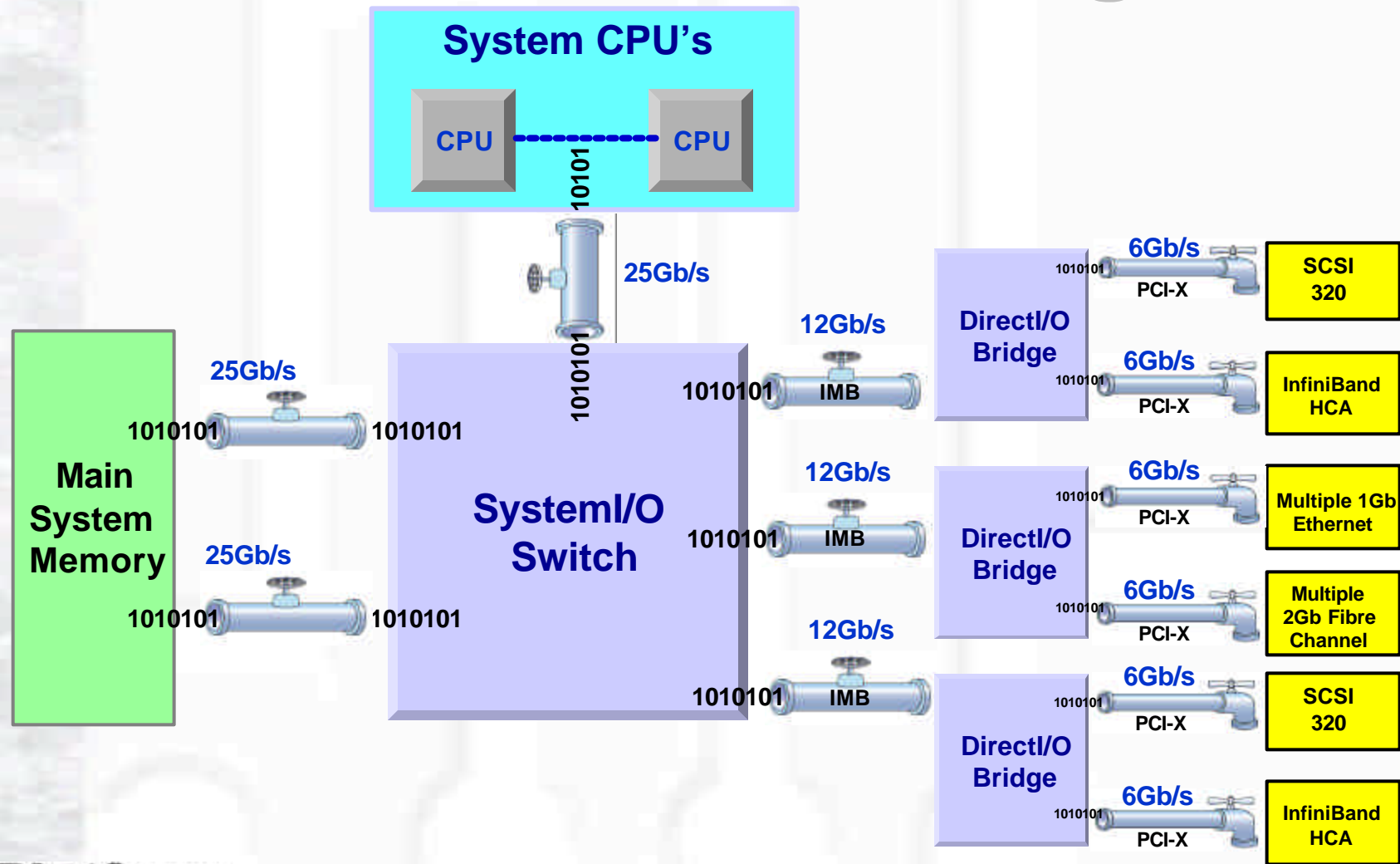
VA Linux

# System/I/O™ Solution Today





# SystemI/O™/DirectI/O™ Solutions Coming



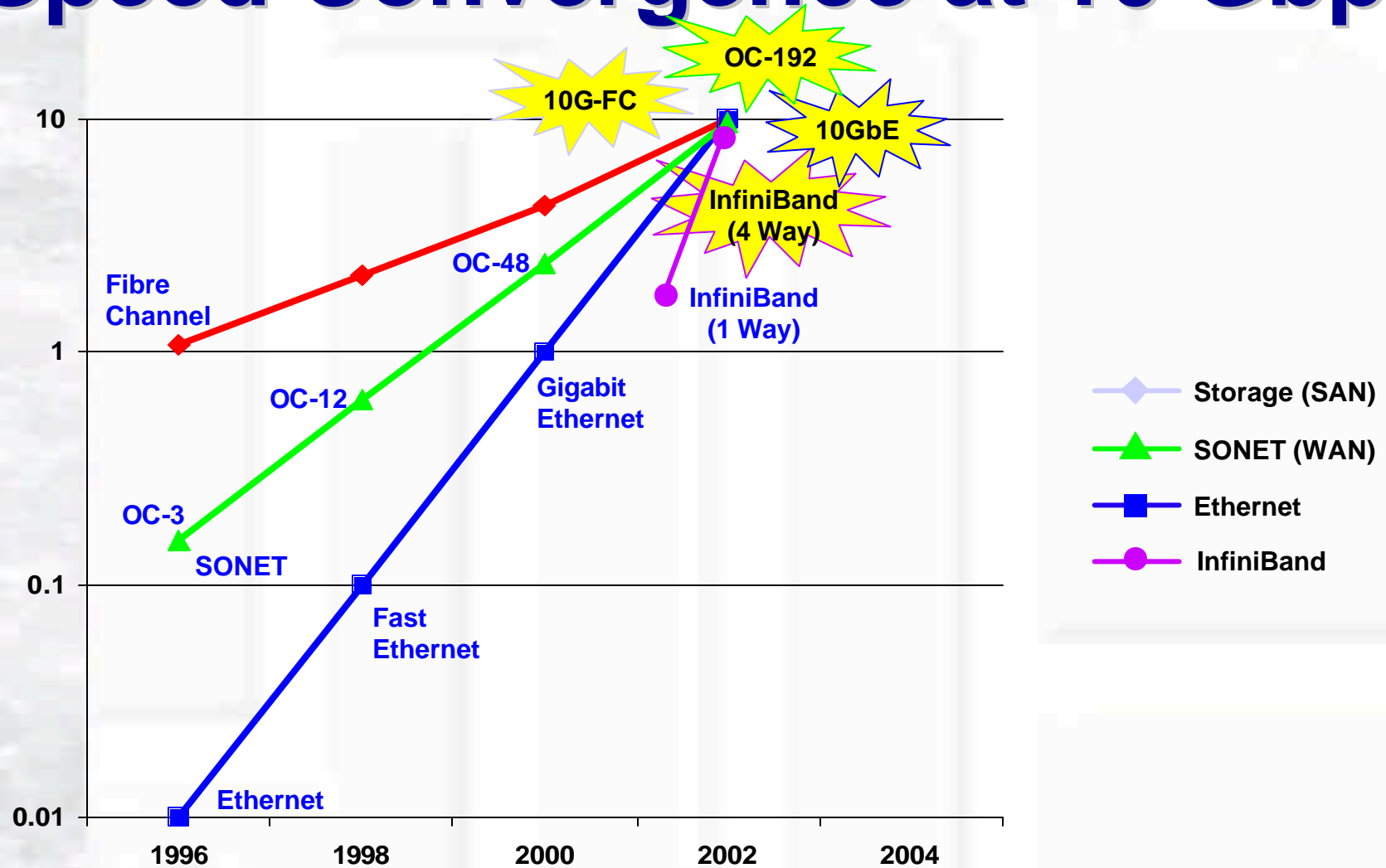
# Key Server Technologies

- High RAS (Reliability, Availability, Scalability) Functionality
  - **Chipkill™ Technology Improves System Reliability and Tolerance to Faulty Devices**
  - **Hot Plug Memory Minimizes Down-Time (No Need to Power Off the System)**
  - **Spare Memory Support**
  - **Memory Mirroring for Highest Memory Fault Tolerance**
  - **128-bit Error Correction Algorithm**

# Breakthrough Memory Technology

- “Memory Expansion Technology” (MXT™)
  - Close Partnership with IBM
  - Compression Effectively Doubles Main Memory Capacity
  - Full Memory Compression and Expansion “On the Fly”
  - Highly Sophisticated Compression Algorithms to Expand/Compress within Nanoseconds the Data Moving Into and from the L3 Cache
  - Dramatically Improves Database & Application Performance

# Speed Convergence at 10 Gbps



# Ethernet – Networking

## Positives

- 1 Gb/sec going to 10 Gb/sec
- Cheap and getting cheaper
- Known cabling scheme
- Copper or optical
- Many switch makers provide competition
- Many silicon providers provide competition
- Available now

## Negatives

- TCP/IP stack causes performance problems
- Slow and inefficient for storage functions

# Fibre Channel - Storage

## Positives

- 1 Gb/sec going to 10 Gb/sec
- Cheap and getting cheaper
- Known cabling scheme
- Copper or optical
- Many switch makers provide competition
- Many silicon providers provide competition
- Available now

## Negatives

- Lack of TCP/IP support negates use with client apps
- Complex, difficult to implement
- Multiple standards
- Lack of interoperability

# InfiniBand – System Clusters

## Positives

- 2.5 Gb/sec going to 10 Gb/sec
- Channel architecture
- Should scale well
- Should be inexpensive
- Copper or optical
- Huge industry interest and stated support
- Available soon

## Negatives

- Lack of TCP/IP support negates use with client apps
- Unknown cabling scheme
- Implementation issues unknown
- Multiple versions
- Interoperability issues being worked on
- New standard allows a clean slate, but will take time

# PCI-X is the next standard I/O

- PCI-X will be the standard way to connect to multiple 1 Gb Ethernet, multiple 1 Gb Fibre Channel, and to InfiniBand
- PCI-X will be the standard way to connect to Ultra 320 SCSI
- PCI-X Futures
  - Need PCI-X 2.0 to connect to 10 Gb Ethernet or 10 Gb Fibre Channel
  - Industry needs Compact PCI-X for appliances and 1U's